

## Mesofauna – Enchytraeidae

### Morphology

Enchytraeidae are also known as 'potworms' and owe their name to first being discovered in flower pots (from the Greek *enchytraeon* meaning 'in the pot'). Each body segment bears four bundles of bristles (setae), two located on the ventral side and two occupying lateral or dorsolateral positions. Numbers of setae per bundle vary between 1 and 16. However, two, three or four are most common, although in some species they are totally absent. Setae are resistant structures, made of chitin, that allow the animal to anchor itself to substrate. Like earthworms (see page 58) and leeches, they are hermaphrodites, as they have reproductive organs normally associated with both male and female sexes. They develop a 'clitellum', a glandular modification of the epidermis (the sheet of cells that covers the body of all animals) which secretes a cocoon where the eggs are deposited; however, some species can reproduce through parthenogenesis or asexually by fragmentation (see the box on the right). [49, 50]



••• An enchytraeid belonging to the species *Cemosvitoviella atrata* from the UK. This species was described for the first time in 1903. A scanning electron microphotograph shows the morphology of enchytraeids. They show annular segmentation and have bundles of bristles, called setae, used to anchor themselves to the soil. (NC, JM, MJIB)

### Taxonomy

The Enchytraeidae are a family of Annelida (class Oligochaeta), resembling small white earthworms (1–30 mm in length) that include both terrestrial and aquatic species. Enchytraeids are identified when alive, since the taxonomy uses external and internal structures, which can be clearly seen only through the living transparent body. A single sample generally contains about 1–15 (rarely more) species. New species are often found; most subtropical and tropical species are still undescribed.



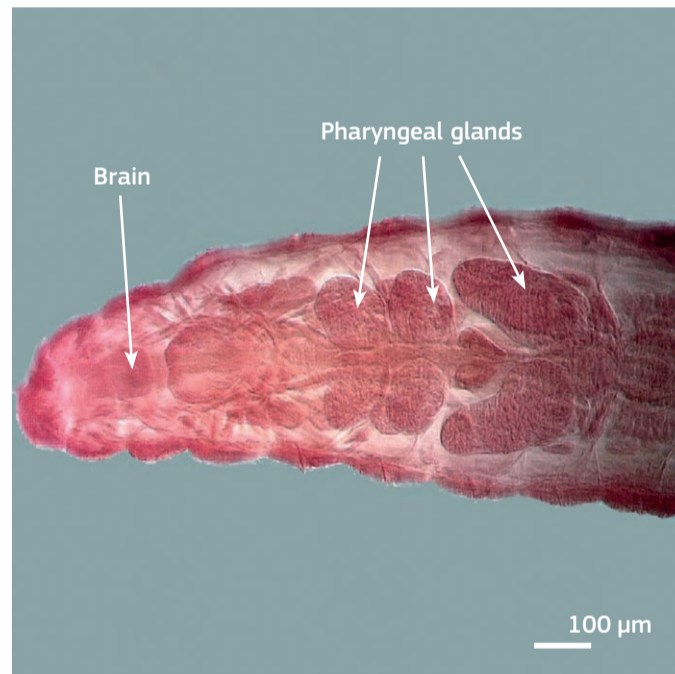
••• (a) An enchytraeid belonging to the species *Enchytraeus albidus* from a laboratory culture. Only some enchytraeids can be raised in the laboratory. To be identified enchytraeids need to be alive, since taxonomists rely on their external and internal structures, which can be clearly seen only through (b) the living transparent body. (RSC, AM)

### Microhabitat

Enchytraeids are concentrated in the uppermost soil layers (0–5 cm), where organic matter accumulates. Most studies regard them as microbial-feeders, frequently grazing on bacteria and fungal mycelia (see box, page 39), although they are also saprovores, consuming dead organic matter.

### Diversity, abundance and biomass

About 700 valid species of enchytraeids have been described. Although they are distributed globally, they are more abundant in non-wooded habitats. In particular, cold and wet organic-rich environments, such as moorlands, contain high numbers (ranging from 12 000 to 311 000 individuals per m<sup>2</sup>), and here enchytraeids are the dominant soil fauna (in terms of live biomass). Seasonal climatic fluctuations have a strong influence on their population dynamics, and extreme weather conditions, such as summer droughts and severely cold winters, can lead to high mortality rates. Although some species can migrate to deeper soil layers to avoid these adverse environmental conditions, this seems to be a short-term survival strategy due to a lack of food in these more humified horizons. Feeding and burrowing activities influence soil structure and turnover of soil organic matter, thus making them 'ecosystem engineers', like termites, ants and earthworms (see pages 54–55, 58).



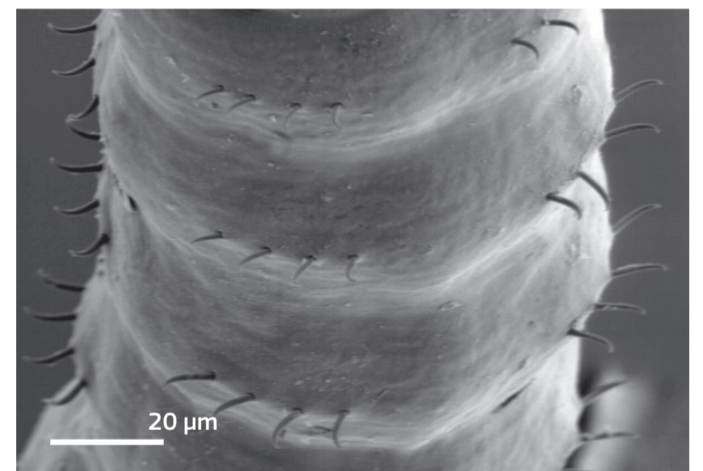
••• An enchytraeid belonging to the species *Bryodrilus ehlersi* from Hungary. Some internal structures, such as the pharyngeal glands and the brain, can be clearly recognised in this image. The pharyngeal glands are laterally paired in each segment in which they are present. They probably serve as a combination of digestive and lubricative functions. (KDF)

### Nothing amazing, apparently...

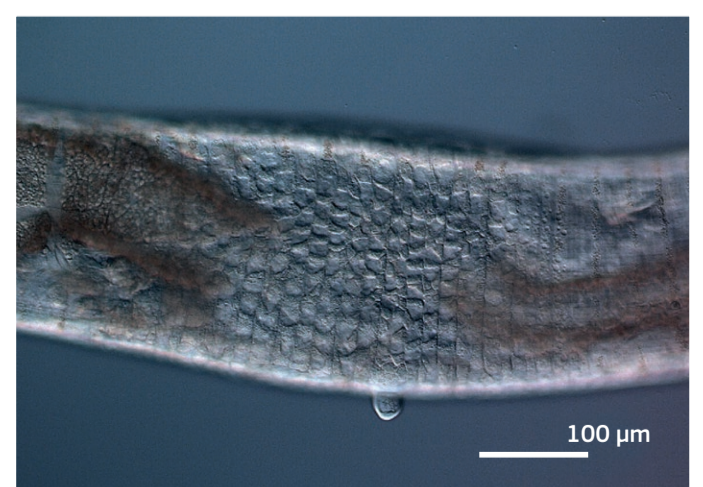
- The most amazing fact about enchytraeids is that there is nothing amazing about them. However, it seems that cold, wet and organic rich ecosystems cannot function without them.
- The largest species (*Mesenchytraeus antaeus*) can be up to 6 cm long with more than 100 segments; the smallest species (*Marionina leionora*) is only 1 mm long and has no more than 15 segments.
- Enchytraeids have a variety of ways to reproduce: by ordinary cross-breeding, with both partners exchanging sperm and laying eggs; by self-fertilisation; by parthenogenesis (i.e. without fertilisation); and also completely asexually by breaking up of a worm into several pieces and regeneration of full-grown worms out of each piece.



••• Anterior end of the enchytraeid *Cemosvitoviella atrata* with a clear view of the first body segment, scientifically called prostomium, and the mouth. (NC, JM, MJIB)



••• Detail on the bundles of bristles, scientifically called setae, of the enchytraeid *Cemosvitoviella atrata* showing its characteristic sigmoid shape. (NC, JM, MJIB)



••• Lateral view of the clitellum of the enchytraeid *Marionina vesiculata*. The clitellum is a glandular modification of the epidermis that secretes a cocoon in which the eggs are deposited. (KDF)